

# Prophylactic Use of Pentoxifylline and Tocopherol to Prevent Osteoradionecrosis of the Jaw in Post-Radiation Oral and Oropharyngeal Cancer Patients.

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## Introduction

Osteoradionecrosis (ORN) of the jaw is a well-known complication of post-radiated head and neck oncology patients. The major risk factor for the precipitation of ORN of the jaw in post-radiated head and neck oncology patients is an invasive dental procedure such as dental extraction, scaling and root planing, bone reduction surgery, and implant placement [1-3]. Post-radiated head and neck oncology patients are susceptible to developing dental caries, which results in unsalvageable teeth requiring dental extractions predisposing them to ORN.

ORN is an area of exposed necrotic bone in a previously irradiated area that does not heal over a period of 3-6 months [4]. The risk for ORN post-invasive dental procedure (IDP) in an irradiated head and neck oncology patient is lifelong [5,6]. ORN is considerably challenging to manage with no standard therapeutic approach.

The prophylactic strategies used to prevent or reduce the risk of ORN after an IDP in post-radiated head and neck cancer patients, have been the use of antibiotics prophylaxis, hyperbaric oxygen therapy, and pentoxifylline and tocopherol (PENTO) [7-9]. This study aims to report the outcome of the prophylactic use of PENTO in the prevention of ORN of the jaw after an IDP.

## Methods

Post-radiated oral and oropharyngeal oncology patients referred to the dental oncology clinic for oral surgical invasive care were prescribed pentoxifylline 400mg BID and tocopherol 400 IU BID for 2 weeks before IDP and for 6 weeks after IDP. The assessment endpoint was defined as 6 weeks post-IDP with the outcomes assessed using four categories which were determined by the area of exposed bone: complete healing; partial healing; no change; and progression.

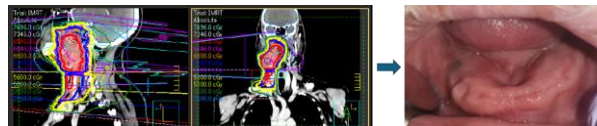
The following information was collected: Age and gender of the patient, tumor type, primary tumor site, radiation dose to primary tumor site, the type of IDP, extracted tooth/teeth sites, and diagnoses of extracted teeth. IRB approvals from University of Tennessee Health Science Center and A. T. Still University.

## Results

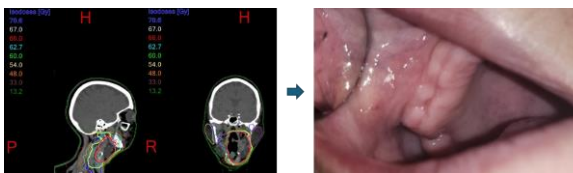
| Case No | Gender | Age | Tumor | Tumor Site [laterality]                             | Radiation Dose to Primary Tumor / Chemotherapy (Yes/No) | Invasive Dental Procedure                                                                                | Tooth/Teeth Diagnosis Prior to Extraction |
|---------|--------|-----|-------|-----------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 1       | M      | 69  | SCC   | Unknown primary (TONGUE)                            | 70 Gy / (Yes)                                           | Extraction (#7)                                                                                          | NP/SAP/NR                                 |
| 2       | M      | 66  | SCC   | Tonsil (Oropharynx) [Right]                         | 70 Gy / (Yes)                                           | Extractions (#1 and #11)                                                                                 | RR / NR                                   |
| 3       | M      | 77  | SCC   | Tonsil (Oropharynx) [Right]                         | 70 Gy / (Yes)                                           | Extractions (#5, #6, #11, #12, #15, #22, #24, #27 and #32)                                               | SIP - NP / SAP / NR                       |
| 4       | M      | 48  | SCC   | Tonsil (Left)                                       | 70 Gy / (Yes)                                           | Extraction (#20)                                                                                         | NP/SAP                                    |
| 5       | M      | 69  | SCC   | Tonsil (Oropharynx) [Right]                         | 70 Gy / (Yes)                                           | Surgical removal of bilateral mandibular bony sequestra                                                  |                                           |
| 6       | M      | 68  | SCC   | Tonsil (Oropharynx) [Right] & Face Parotid (Left)   | 70 Gy / (Yes) & Irradiated 70 Gy                        | Extractions (#7, #10, #12, #14 and #21 -#26) and surgical removal of bilateral mandibular bony sequestra | SIP - NP / SAP / NR                       |
| 7       | F      | 62  | SCC   | Posterior wall of oropharynx                        | 70 Gy / (Yes)                                           | Surgical removal of posterior mandibular bony sequestra                                                  |                                           |
| 8       | M      | 56  | SCC   | Oral Tongue/Floor of Mouth                          | 70 Gy / (Yes)                                           | Extractions (#21 - #26)                                                                                  | SIP / SAP / NR                            |
| 9       | M      | 69  | SCC   | Base of Tongue (Oropharynx)                         | 70 Gy / (Yes)                                           | Extraction (#18)                                                                                         | SAP / NR                                  |
| 10      | M      | 70  | SCC   | Ventral Tongue/Floor of Mouth (Oral Cavity) [Right] | 70 Gy / (Yes)                                           | Extractions (#24, #25, #26, and #30)                                                                     | RR / SIP / SAP / NR                       |
| 11      | F      | 59  | SCC   | Tonsil (Oropharynx) [Right]                         | 70 Gy / (Yes)                                           | Extraction (#18)                                                                                         | RR / NR                                   |
| 12      | M      | 75  | ACC   | Hard palate/Maxillary Sinus (Oral Cavity) [Left]    | 66 Gy / (No)                                            | Extraction (#18 and #11)                                                                                 | NP - SAP                                  |
| 13      | F      | 56  | SCC   | Hard and Soft Palate (Oral Cavity)                  | 88 Gy (Yes)                                             | Extractions (#4, #5, and #12)                                                                            | SIP / SAP - RR / NR                       |
| 14      | M      | 67  | SCC   | Base of Tongue                                      | 70 Gy (Yes)                                             | Extractions (#14 and #15)                                                                                | RR / NR                                   |

### Summary

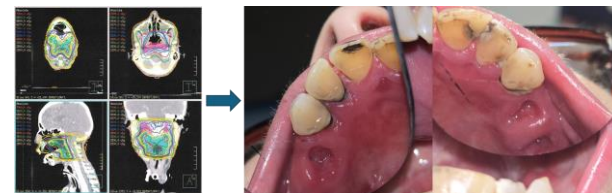
Fourteen (11 males and 3 females; ages range from 48 – 77 years) post-radiated (min: 70 Gy) oral and oropharyngeal oncology patients received IDP varying from extractions (n=48 teeth), surgical reduction of tori and bony exostoses. At the assessment endpoint, all patients had complete healing of all IDP sites.



Case 6



Case 7



Case 13

## Conclusions

The ORN rate at patient level (0/14) and individual tooth level (0/48) was 0%. The PENTO regimen appears effective in reducing or preventing ORN in these patients. Given its safety and cost-effectiveness, the PENTO protocol should be adopted as a prophylactic measure for post-radiated head and neck oncology patients undergoing invasive dental procedures. We recommend conducting large prospective studies to further confirm these findings.

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